IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A lithographic apparatus comprising:

a radiation system to provide a projection beam of radiation, the radiation system comprising an illumination system for defining a position dependent intensity distribution of the beam in a pupil plane;

a support structure for supporting a patterning structure, the illumination system defining an angle dependent intensity distribution of the beam at the patterning structure dependent on the position dependent intensity distribution in the pupil plane;

a substrate table for holding a substrate;

a projection system for projecting the patterned beam onto a target portion of the substrate;

a beam splitter positioned in a path of the projection beam during operation of the lithographic apparatus, the beam splitter splitting off an auxiliary beam; ~~, and~~

a detector with a detection element disposed in a path of the auxiliary beam so as to detect information about a position dependent intensity distribution corresponding to the pupil plane; and

a controller having an input coupled to said detector and an output coupled to said illumination system,

wherein the controller is configured to receive detected information from said detector and to provide a feedback to said illumination system to control a parameter of the illumination system.

2. (Currently Amended) A lithographic apparatus according to claim 1, wherein the illumination system comprises ~~comprising~~ an optical element ~~with~~ having a controllable parameter and the controller is configured to control said parameter depending on the detected information. ~~a controller having an input coupled to said detector and an output coupled to the optical element for controlling said parameter dependent on the detected information.~~

3. (Currently Amended) A lithographic apparatus according to claim 2, wherein the controller ~~having~~ comprises an interface for receiving a desired position dependence of the intensity distribution at the pupil plane, and wherein the controller ~~being~~ is arranged to regulate the parameter so as to approximate the desired position dependence.

4. (Currently Amended) A lithographic apparatus according to claim 2, wherein the optical element comprises a matrix of elements, each element in said matrix of elements redirecting the projection beam in a respective individually controllable direction, and wherein the controller ~~being~~ is ~~arranged~~ configured to ~~adapt~~ control a fraction of the elements ~~that~~ to redirect the beam to an area in said pupil plane ~~dependent~~ depending on a discrepancy between a desired and a measured intensity over said area.

5. (Currently Amended) A lithographic apparatus according to claim 2, wherein the controller is arranged to control the parameter ~~dependent~~ depending on the measured position dependence, at least during exposure of ~~a~~ the substrate.

6. (Currently Amended) A lithographic apparatus according to claim 1,

wherein the beam splitter is located at an offset position from the pupil plane in the path of the projection beam,

wherein the detection element ~~being~~ is arranged to detect an intensity distribution across the auxiliary beam, and

wherein the ~~apparatus comprising~~ controller comprises a deconvolution unit for deconvoluting a discrepancy between the intensity distributions at the pupil plane and at the detection element due to propagation of radiation along a sub-path between the pupil plane and the detection element.

7. (Currently Amended) A lithographic apparatus according to claim 1, wherein the beam splitter comprises a mirror surface ~~that reflects~~ configured to reflect a portion of the projection beam~~, the mirror surface transmitting a further~~ and to transmit another portion of the projection beam as the auxiliary beam, and wherein the detection element is arranged to substantially intercept ~~intercepting~~ the auxiliary beam ~~substantially~~ at a back side of the mirror surface.

8. (Currently Amended) A lithographic apparatus according to claim 1, further comprising a correction element, wherein the beam splitter comprises a mirror surface ~~that reflects~~ configured to reflect a portion of the projection beam~~, the mirror surface transmitting a further~~ and to transmit another portion of the projection beam as the auxiliary beam, and wherein the detection element is positioned to intercept ~~intercepting~~ the auxiliary beam following the mirror surface, and the ~~a~~ correction optical element ~~or optical elements being included~~ is disposed between the mirror surface and the detection element.

9. (Currently Amended) A lithographic apparatus according to claim 1, further comprising: ~~an initial pupil plane,~~

a light conducting rod ~~with~~ having reflecting side walls to reduce position dependence of the intensity distribution of the beam, the rod being ~~included~~ disposed in the path of the projection beam between the ~~initial~~ pupil plane and a first image plane of the ~~initial~~ pupil plane [[,]] ; and

~~one or more~~ at least one optical element ~~elements~~ configured to image the ~~initial~~ pupil plane onto the first image plane of the pupil plane,

wherein the beam splitter ~~being located optically~~ is positioned downstream of the light conducting rod.

10. (Currently Amended) A lithographic apparatus according to claim 1, wherein the beam splitter is ~~located~~ positioned in the path of the beam preceding the ~~initial~~ pupil plane.

11. (Currently Amended) A device manufacturing method comprising:

~~providing a projection beam having a position dependent intensity distribution in a pupil plane of radiation using a radiation system, the position dependence determining an angle dependence of the intensity distribution of the projection beam at a substrate;~~

patterning ~~the~~ a projection beam with a pattern in its cross-section, the projection beam having a position dependent intensity distribution in a pupil plane of a radiation system providing the projection beam, the position dependent intensity distribution determining an angle dependent intensity distribution of the projection beam at a substrate;

projecting the patterned projection beam ~~of radiation~~ onto a target portion of a layer of radiation-sensitive material on the substrate;

splitting an auxiliary beam from the projection beam;

measuring an intensity distribution across the auxiliary beam; and

controlling an intensity distribution at the pupil plane~~, dependent on~~ by returning the intensity distribution measured across the auxiliary beam via a feedback loop.

12. (Currently Amended) A device manufacturing method according to claim 11,

wherein said measuring comprises measuring a desired position dependence of the intensity distribution at the pupil plane ~~is received~~, and

wherein said controlling comprises ~~a parameter of the illumination system is used in a feedback loop under control of~~ controlling the measured position dependence so as to make the position dependence of the intensity distribution of the beam approximate the desired position dependence of the intensity distribution by controlling a parameter of the illumination system via the feedback loop.

13. (Currently Amended) A device manufacturing method according to claim 12, further comprising:

~~wherein the illumination system comprises a matrix of elements, each redirecting the projection beam in a respective individually controllable direction, the method comprising~~

adapting a fraction of ~~the~~ a matrix of elements in the illumination system ~~that~~ to redirect the beam to an area in said pupil plane ~~dependent~~ depending on a discrepancy between a desired and a measured intensity over said area, each element in the matrix of elements is adapted to redirect the projection beam in a respective individually controllable direction.

14. (Currently Amended) A device manufacturing method according to claim 11, ~~wherein the controller is arranged to control~~ wherein said controlling comprises controlling ~~said~~ a parameter of the illumination system ~~dependent~~ depending on the measured position dependence during exposure of the layer of radiation-sensitive material.

15. (Currently Amended) A device manufacturing method according to claim 11, wherein said splitting comprises splitting the auxiliary beam ~~is split~~ from the projection beam at a location ~~at an~~ offset from the pupil plane in the path of the projection beam, and said measuring comprises measuring the intensity distribution ~~at a surface~~ in a plane across the auxiliary beam~~,~~ and deconvoluting a discrepancy between the intensity ~~distributions~~

distribution at the pupil plane and the intensity distribution at said plane ~~said surface due to propagation of radiation along a sub-path between the pupil plane and the detection element~~.

16. (Currently Amended) A device manufacturing method according to claim 11, wherein said splitting comprises ~~is performed~~ using a partially transparent mirror surface ~~from which~~ to reflect a portion of the projection beam ~~is reflected~~ and ~~a further~~ to transmit another portion ~~is transmitted forming~~ of the projection beam to form the auxiliary beam, said auxiliary beam being ~~which is~~ intercepted substantially at a back surface of said mirror surface ~~for detection of~~ so as to detect the intensity distribution.

17. (Currently Amended) A device manufacturing method according to claim 11, further comprising:

homogenizing the intensity distribution of the projection beam, and ~~said auxiliary beam being split off after homogenizing~~

after said homogenizing, splitting off said auxiliary beam.

18. (Currently Amended) A device manufacturing method according to claim 11, further comprising regulating a position dependence of the intensity distribution of the projection beam at the substrate in parallel with regulating the position dependence at the pupil plane.

19. (New) A lithographic apparatus comprising:

a radiation system to provide a projection beam of radiation, the radiation system comprising an illumination system for defining a position dependent intensity distribution of the beam in a pupil plane;

a support structure for supporting a patterning structure, the illumination system defining an angle dependent intensity distribution of the beam at the patterning structure dependent on the position dependent intensity distribution in the pupil plane;

a substrate table for holding a substrate;

a projection system for projecting the patterned beam onto a target portion of the substrate;

a beam splitter positioned in a path of the projection beam during operation of the lithographic apparatus, the beam splitter splitting off an auxiliary beam;

a detector with a detection element disposed in a path of the auxiliary beam so as to detect information about a position dependent intensity distribution corresponding to the pupil plane;

a light conducting rod having reflecting side walls to reduce position dependence of the intensity distribution of the beam, the rod being disposed in the path of the projection beam between the pupil plane and a first image plane of the pupil plane; and

at least one optical element configured to image the pupil plane onto the first image plane of the pupil plane,

wherein the beam splitter is positioned downstream of the light conducting rod.